

# Millennial Tendencies in Responses to Apocalyptic Threats

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James J. Hughes

Public Policy Studies

Williams 229B, 300 Summit St.

Hartford, CT 06106

USA

e-mail: [james.hughes@trincoll.edu](mailto:james.hughes@trincoll.edu)

## Introduction

Since Aaron Wildavsky proposed in 1987 that cultural orientations such as egalitarianism and individualism frame public perceptions of technological risks, a body of empirical research has grown to affirm the risk-framing effects of personality and culture (Dake, 1991; Gastil et al., 2005; Kahan, 2008). Most of these studies have focused on relatively mundane risks, however, such as handguns, nuclear power, genetically modified food, and cellphone radiation. In the contemplation of truly catastrophic risks, risks to the future of the species from technology or natural threats, a different and deeper set of cognitive biases come into play, the millennial, utopian or apocalyptic psycho-cultural bundle, a characteristic dynamic of eschatological beliefs and behaviors. This essay is an attempt to outline the characteristic forms millennialism has taken, and how it biases assessment of catastrophic risks and the courses of action necessary to address them.

Millennialism is the expectation that the world as it is will be destroyed and replaced with a perfect world, that a redeemer will come to cast down the evil and raise up the righteous (Cohn, 1970; Barkun, 1974).

Millennialism is closely tied to other historical phenomena, utopianism, apocalypticism, messianism and millenarian violence. Western historians of millennialism have focused the most attention on the emergence of Christianity out of the messianic expectations of subjugated Jewry, and subsequent Christian movements based on exegesis of the Book of Revelations expecting imminent return of Christ. But the millennial impulse is pancultural, found in many guises and with many common tropes from Europe to India to China, across the last several thousand years. When Chinese peasants followed religio-political revolutionaries claiming the mantle of the Coming Buddha, and when Mohammed birthed Islam preaching that the Last Judgment was imminent, they exhibited many similar features to medieval French peasants leaving their fields to follow would-be John the Baptists. Nor is the millennial impulse restricted to religious movements and beliefs in magical or supernatural agency. Revolutionary socialism and fascism embodied the same impulses and promises, although purporting to be based on science, *das Volk* and the secular state instead of prophecy, the body of believers and the Kingdom of Heaven (Rhodes, 1980; Rowley, 1983).

In this essay I will review some of the variety of ways in which the millennial impulse has manifested. Then I will parse contemporary secular expectations about catastrophic risks and utopian possibility for signs of these characteristic millennial dynamics. Finally, I will suggest that by avoiding the undertow of the psychocultural dysfunctions and cognitive biases that often accompany millennialism we may be able to better anticipate the real benefits and threats that we face in this era of accelerating change, and take appropriate prophylactic action to ensure a promising future for the human race.

### Types of Millennialism

Western scholars have pointed to three theological positions among Christian millennialists that appear to have some general applicability to millennial typology, based on the role of human agency in ending Tribulations and bringing the Millennium.

#### *Premillennialism*

Premillennialism is the most familiar form of millennial thought in the United States and Europe today, characterized by the belief that everything will get awful before the millennium makes them better (Whalen, 2000). Christian premillennialists, among them many early Christians, have based their eschatological expectations on the Book of Revelations. They believed that the Antichrist will preside over a period of Tribulations, followed by God's rescue of the righteous, the Rapture. Eventually Christ returns, defeats evil, judges all resurrected souls, and establishes a reign of the Kingdom of Heaven on Earth. Saved people will spend eternity in this new kingdom, and the unsaved will spend an eternity in damnation.

This doctrine was reintroduced among Protestants in the 1830s in the United States as "dispensationalism" (Boyer, 1994; Crutchfield, 1992). Some dispensationalists became "Millerites," influenced by the exegetical efforts of a 19<sup>th</sup> century lay scholar, William Miller, to interpret contemporary events as a fulfillment of a prophetic timeline in the Book of Revelations. Dispensationalism and Millerism inspired some successful sects that have flourished to this day, such as the Seventh-Day Adventists and the

Jehovah's Witnesses, despite their failed prophecies of specific dates for the Second Coming.

Premillennialism gained general acceptance among Christian evangelicals only in the 20<sup>th</sup> century. Hal Lindsey's *The Late Great Planet Earth* (1970) popularized the thinking of modern Millerites who saw the European Union, the re-creation of the state of Israel and other modern trends as fulfillment of the millennial timeline. Christian Right politicians such as Pat Robertson, a former Republican candidate for President, are premillennialists, interpreting daily events in the Middle East for the millions in their television and radio audience through the lens of Biblical exegesis. Premillennialism is also the basis of the extremely popular *Left Behind* novels by Jerry Jenkins and Tim LaHaye, and their film adaptations.

Premillennialists are generally fatalists who do not believe human beings can influence the timing or outcome of the Tribulations, Rapture and Second Coming (Wojcik, 1997). The best the believer can do is save as many souls as possible before the end. A very similar doctrine can be found among certain Mahayana Buddhists who held that, after the passing of each Buddha, the world gradually falls into the age of *mappo* or the degeneracy of the Buddhist teachings. In the degenerate age enlightenment is nearly impossible, and the best that we can hope for is the intercession of previously enlightened, and now divine, beings to bring us to a Pure Land (Blum, 2002). The Japanese monk Nichiren Daishonin (1222-1282) founded one of the most successful schools of Japanese Buddhism using the idea of *mappo* as the rationale for his new dispensation. For Nichiren Buddhists Japan will play a millennial role in the future as the basis for the conversion of the entire world to the Buddhist path (Stone, 1985).

In a secular context, Marxist futurism has often been appropriated into a form of premillennial expectation. According to classical Marxist eschatology the impersonal workings of capitalism and technological innovation will immiserate all the people of the world, wipe out all preexisting identities and institutions, and then unite the world into revolutionary working-class movement. The role of self-conscious revolutionaries is only to explain this process to workers so that they understand their role in the unfolding of the inevitable historical telos and hastening the advent of the millennial worker's paradise.

***Amillennialism***

Amillennialists believe that the millennial event has already occurred, or is occurring, in the form of some movement or institution, even though there are still bad things happening in the world (Hoekema, 2007; Riddlebarger, 2003). For Christian amillennialists the Millennium is actually the ongoing establishment of righteousness on Earth through the agency of the Church, struggling to turn back Satan and the Tribulations. Augustinian amillennialism was made the official doctrine of the early Christian Church, and premillennialism was declared heresy. The subsequent millenarian rebellions against church and civil authority, inspired by the Book of Revelations, reinforced the Catholic Church's insistence that the Millennium would not be an abrupt, revolutionary event, but the gradual creation of the Kingdom of Heaven in each believer's heart in a Church-ruled world. In the abstract, when the "Church Age" ends Christ will return to judge humanity, and take the saved to heaven for eternity, but attempts to predict the timeline are proscribed.

Another, more radical and recent example of amillennialism was found in the Oneida Community (1848-1881) in upstate New York, founded by John Humphrey Noyes (Klaw, 1993). Noyes believed that the Second Coming had occurred in 70 A.D., and that all believers should begin to live as if in the Kingdom of Heaven, including forbidding monogamy and private property. Orthodox Communist or Maoists outside of the Soviet Union or China can be seen as secular amillennialists, believing Stalin's and Mao's regimes were paradises in which eventually all humanity would be able share.

***Postmillennialism***

Postmillennialists believe that specific human accomplishments are necessary to bring the millennium (Bock, 1999). Post-millennialist Christians argue that if Christians establish the Kingdom of Heaven on Earth through Christian rule this will hasten or be synonymous with the Second Coming. This doctrine has inspired both progressive "Social Gospel" theologies, such as slavery abolitionism and anti-alcohol temperance, as well as theocratic movements such as the contemporary far Right "Christian Reconstruction" and Dominionism.

The Buddhist Pali canon scriptures that describe the coming Buddha, Maitreya, are an example of post-

millennialism (Hughes, 2007). The scripture foretells that humanity, repulsed by the horrors of an apocalyptic war, will build a utopian civilization thickly populated with billions of happy, healthy people who live for thousands of years in harmony with one another and nature. The average age at marriage will be five hundred years. The climate will always be good, neither too hot nor too cold. Wishing trees in the public squares will provide anything you need. The righteous king dissolves the government, and turns over the property of the state to Maitreya. These millennial beliefs inspired a series of Buddhist uprisings in China (Naquin, 1976), and helped bring the Buddhist socialist movement in Burma to power from 1948 to 1962 (Malagoda, 1970).

This worldview also corresponds to revolutionary Marxist-Leninism. Although the march of history is more or less assured, the working class may wander for centuries through the desert until the revolutionary vanguard can lead them to the promised land. Once socialism is established, it will gradually evolve into communism, in which the suppressed and distorted true human nature will become non-acquisitive and pro-social. Technology will provide such abundance that conflict over things will be unnecessary, and the state will wither. But revolutionary human agency is necessary to fulfill history.

***Messianism and Millenarianism***

Messianism and millenarianism are defined here as forms of millennialism in which human agency, magical or revolutionary, is central to achieving the Millennium. Messianic movements focus on a particular leader or movement, while millenarian movements, such as many of the peasant uprisings of fifteenth and sixteenth Europe, believe revolutionary violence to smash the evil old order will help usher in the Millennium (Rhodes, 1980; Smith, 1999; Mason, 2002). Al Qaeda is, for instance, rooted in Islamic messianic eschatology; the Jihad to establish the global Caliphate is critical in the timeline for the coming of the Mahdi, or messiah. Osama bin Laden is only the latest of a long line of Arab leaders claiming, or being ascribed, the mantle of Mahdism (Cook, 2005; Furnish, 2005). In the Hindu and Buddhist messianic tradition there is the belief in the periodic emergence of MahaPurushas, "great men," who arrive in times of need to provide either righteous rule or saintliness. Millenarian uprisings in China were often led by men claiming to be

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Maitreya, the Next Buddha. Secular messiahs and revolutionary leaders are similarly often depicted in popular mythology as possessing extraordinary wisdom and abilities from an early age, validating their unique eschatological role. George Washington could never tell a lie and showed superhuman endurance at Valley Forge, while Chairman Mao was a modern Moses, leading his people on a Long March to Zion and guiding the masses with the wisdom in his little red book.

### Positive or Negative Teleologies: Utopianism and Apocalypticism

Utopianism and apocalypticism are defined here as the millennial impulse with, respectively, an optimistic and pessimistic eschatological expectation. By utopianism I mean the belief that historical trends are inevitably leading to a wonderful millennial outcome (Manuel and Manuel, 1979), including the Enlightenment narrative of inevitable human progress (Tuveson, 1949; Nash, 2000). By apocalypticism I don't mean simply the belief that something very bad may happen, since very bad events are simply a prelude to very good events for most millennialists, but that the bad event will be cataclysmic, or even the end of history.

In that sense, utopianism is the default setting of most millennial movements, even if the Tribulations are expected to be severe and indeterminately long. The promise of something better, at least for the righteous, is far more motivating than a guaranteed bad end. Even the most depressing religious eschatology, the Norse *Ragnarok* - at which humans and gods are defeated, and Earth and the heavens are destroyed - holds out a millennial promise that a new earth and Sun will emerge, and the few surviving gods and humans will live in peace and prosperity (Crossley-Holland, 1981).

Millennial expectations of better times have not only been a comfort to people with hard, sad lives, an "opium for the masses," but also, because of their mobilizing capacity, an essential catalyst of social change and political reform (Hobsbawm, 1959; Lanternari, 1965; Jacoby, 2005). From Moses' mobilization of enslaved Jewry with a promise of a land of milk and honey, to medieval millenarian peasant revolts, to the Sioux Ghost Dance, to the integrationist millennialism of the African-American civil rights movement, millenarian leaders have

arisen out of repressive conditions to preach that they could lead their people to a new Zion. Sometimes the millennial movements are disastrously unsuccessful when they rely on supernatural methods for achieving their ends, as with the Ghost Dance (Mooney, 1991). Sometimes utopian and millennial currents contribute to social reform even in their defeat, as they did from the medieval peasant revolts through the rise of revolutionary socialism (Jacoby, 2005). Although movements for utopian social change were most successful when they focused on temporal, rather than millennial, goals through human, rather than supernatural, agency, expectations of utopian outcomes helped motivate participants to take risks on collective action against large odds.

Although there have been few truly apocalyptic movements or faiths, those which foretell an absolute, unpleasant and unredeemed end of history, there have been points in history with widespread apocalyptic expectation. The stories of the Biblical flood and the destruction of Sodom and Gomorrah alerted Christians to the idea that God was quite willing to destroy almost all of humanity for our persistent sinfulness, well before the clock starts on the Tribulation-Millennium timeline. Although most mythic beliefs include apocalyptic periods in the past and future, as with *Ragnarok* or the Hindu-Buddhist view of a cyclical destruction-recreation of the universe, most myths make apocalypse a transient stage in human history.

It remained for more secular times for the idea of a truly cataclysmic end of history, with no redeeming Millennium, to become a truly popular current of thought (Wagar, 1982; Heard, 1999; Wojcik, 1997, 1999). Since the advent of the Nuclear Age, one apocalyptic threat after another, natural and man-made, has been added to the menu of ways that human history could end, from environmental destruction and weapons of mass destruction, to plague and asteroid strikes (Leslie, 1998; Halpern, 2001; Rees, 2004). In a sense, long-term apocalypticism is also now the dominant scientific worldview, insofar as most scientists see no possibility for intelligent life to continue after the Heat Death of the Universe (2002, Ellis; see also the chapter by Adams in this book).

### *The Singularity and Techno-millennialism*

Joel Garreau's (2006) recent book on the psycho-culture of accelerating change, *Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies-and What It Means to Be Human*, is structured in three parts: Heaven, Hell and Prevail. In the Heaven scenario he focuses on the predictions of inventor Ray Kurzweil, summarized in his 2005 book, *The Singularity is Near*. The idea of a techno-millennial "Singularity" was coined in a 1993 paper by mathematician and science fiction author Vernor Vinge. In physics "singularities" are the centers of black holes, within which we can't predict how physical laws will work. In the same way, Vinge said, greater-than-human machine intelligence, multiplying exponentially, would make everything about our world unpredictable. Most Singularitarians, like Vinge and Kurzweil, have focused on the emergence of super-human machine intelligence. But the even more fundamental concept is exponential technological progress, with the multiplier quickly leading to a point of radical social crisis. Vinge projected that self-willed artificial intelligence would emerge within the next thirty years, by 2023, with either apocalyptic or millennial consequences. Kurzweil predicts the Singularity for 2045.

The most famous accelerating trend is "Moore's Law," articulated by Intel co-founder Gordon Moore in 1965, which is the observation that the number of transistors that can be fit on a computer chip has doubled about every eighteen months since their invention. Kurzweil goes to great lengths to document that these trends of accelerating change also occur in genetics, mechanical miniaturization, and telecommunications, not just transistors. Kurzweil projects that the "law of accelerating returns" from technological change is "so rapid and profound it represents a rupture in the fabric of human history." For instance, Kurzweil predicts that we will soon be able to distribute trillions of nanorobots in our brains, and thereby extend our minds, and eventually upload our minds into machines. Since lucky humans will at that point merge with or become superintelligence, some refer to the Singularity as the "Techno-Rapture," pointing out the similarity of the narrative to the Christian Rapture; those foresighted enough to be early adopters of life extension and cybernetics will live long enough to be uploaded and "vastened" - given

vastly expanded mental abilities - after the Singularity. The rest of humanity may however be "left behind."

This secular "left behind" narrative is very explicit in the Singularitarian writings of computer scientist Hans Moravec (1990, 2000). For Moravec the human race will be superceded by our robot children, among whom some of us may be able to expand to the stars. In his *Robot: Mere Machine to Transcendent Mind*, Moravec says "Our artificial progeny will grow away from and beyond us, both in physical distance and structure, and similarity of thought and motive. In time their activities may become incompatible with the old Earth's continued existence...An entity that fails to keep up with its neighbors is likely to be eaten, its space, materials, energy, and useful thoughts reorganized to serve another's goals. Such a fate may be routine for humans who dally too long on slow Earth before going Ex." Here we have Tribulations and damnation for the late adopters, in addition to the millennial utopian outcome for the elect.

While Kurzweil acknowledges apocalyptic potentials – such as humanity being destroyed by superintelligent machines - inherent in these technologies, he is nonetheless uniformly utopian and enthusiastic. Hence Garreau's labeling Kurzweil's the "Heaven" scenario. While Kurzweil acknowledges his similarity to millennialists by, for instance, including a tongue-in-cheek picture in *The Singularity is Near* of himself holding a sign with that slogan, referencing the classic cartoon image of the EndTimes street prophet, most Singularitarians angrily reject such comparisons insisting their expectations are based solely on rational, scientific extrapolation.

Other Singularitarians embrace parallels with religious millennialism however. John Smart, founder and director of the California-based Acceleration Studies Foundation, often notes the similarity between his own "Global Brain" scenario and the eschatological writings of the Jesuit paleontologist Teilhard de Chardin (2007). In the Global Brain scenario, all human beings are linked to one another and to machine intelligence in the emerging global telecommunications web, leading to the emergence of collective intelligence. This emergent collectivist form of Singularitarianism was proposed also by Peter Russell (1983) in *The Global Brain*, and Gregory Stock (1993) in *Metaman*. Smart (2007) argues that the scenario of an emergent global

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human-computer meta-mind is similar to Chardin's eschatological idea of humanity being linked in a global "noosphere," or info-sphere, leading to a postmillennial "Omega Point" of union with God. Computer scientist Juergen Schmidhuber (2006) also has adopted Chardin's "Omega" to refer to the Singularity.

For most Singularitytarians, as for most millennialists, the process of technological innovation is depicted as autonomous of human agency, and wars, technology bans, energy crises or simple incompetence are dismissed as unlikely to slow or stop the trajectory. Kurzweil insists for instance that the accelerating trends he documents have marched unhindered through wars, plagues and depressions (Kurzweil, 2006). Other historians of technology argue that Kurzweil ignores techno-trends which did stall, due to design challenges and failures, and to human factors that slowed the diffusion of new technologies, factors which might also slow or avert greater-than-human machine intelligence (Lanier, 2000; Seidensticker, 2006; Wilson, 2007). Noting that most predictions of electronic transcendence fall within the predictor's expected lifespan, technology writer Kevin Kelly suggests that people who make such predictions have a cognitive bias toward optimism (Kelly, 2007).

The point of this essay is not to parse the accuracy or empirical evidence for exponential change or catastrophic risks however, but to examine how the millennialism that accompanies their consideration biases assessment of their risks and benefits, and the best courses of action to reduce the former and ensure the latter. There is of course an important difference between fear of a civilization-ending nuclear war, grounded in all-too-real possibility, and fear of the end of history from a prophecied supernatural event. I do not mean to suggest that all discussion of utopian and catastrophic possibilities are merely millennialist fantasies, but rather that recognizing millennialist dynamics permits more accurate risk/benefit assessments and more effective prophylactic action.

### ***Techno-apocalypticism***

In *Radical Evolution* Joel Garreau's Hell scenario is centered on the Luddite apocalypticism of the techno-millennial apostate, Bill Joy, former chief scientist and co-founder of Sun Microsystems. In the late 1990s Joy began to believe that genetics, robotics and nanotechnology posed novel apocalyptic risks to

human life. These technologies, he argued, posed a different kind of threat because they could self-replicate; guns don't breed and shoot people on their own, but a rogue bioweapon could. His essay "Why the Future Doesn't Need Us," published in April 2000 in *Wired* magazine, called for a global, voluntary "relinquishment" of these technologies.

Greens and others of an apocalyptic frame of mind were quick to seize on Joy's essay as an argument for the enacting of bans on technological innovation, invoking the "precautionary principle," the idea that a potentially dangerous technology should be fully studied for its potential impacts before being deployed. The lobby group ETC argued in its 2003 report "The Big Down" that nanotechnology could lead to a global environmental and social catastrophe, and should be placed under government moratorium. Anxieties about the apocalyptic risks of converging bio-, nano- and information technologies have fed a growing Luddite strain in Western culture (Bailey 2001a, 2001b), linking Green and anarchist advocates for neo-pastoralism (Mander, 1992; Sale, 2001; Zerzan, 2002; Jones, 2006), to humanist critics of techno-culture (Ellul, 1967; Roszak, 1986; Postman, 1993) to apocalyptic survivalists to Christian millennialists. The neo-Luddite activist Jeremy Rifkin has, for instance, built coalitions between secular and religious opponents of reproductive and agricultural biotechnologies, arguing that the encroachment into the natural order will have apocalyptic consequences. Organizations like the Chicago-based Institute on Biotechnology & The Human Future, which brings together bio- and nano-critics from the Christian Right and the secular Left, represent the institutionalization of this new Luddite apocalypticism advocating global bans on "genocidal" lines of research (Annas, Andrews and Isasi, 2002).

Joy has, however, been reluctant to endorse Luddite technology bans. Joy and Kurzweil are entrepreneurs and distrust regulatory solutions. Joy and Kurzweil also share assumptions about the likelihood and timing of emerging technologies, differing only in their views on the likelihood of millennial or apocalyptic outcomes. But they underlined their *similarity* of worldview by issuing a startling joint statement in 2005 condemning the publication of the genome of the 1918 influenza virus, which they viewed as a cookbook for a potential bioterror weapon (Kurzweil and Joy, 2005). Disturbing their friends in science and biotech, leery of government mandates for secrecy, they called for "international

agreements by scientific organizations to limit such publications" and "a new Manhattan Project to develop specific defenses against new biological viral threats."

In the 1990s anxieties grew about the potential for terrorists to use recombinant bioengineering to create new bio-weapons, especially as bioweapon research in the former Soviet Union came to light. In response to these threats the Clinton administration and US Congress started major bioterrorism preparedness initiatives in the 1990s, despite warnings from public health advocates like Laurie Garrett (1994, 2000) that monies would be far better spent on global public health initiatives to prevent, detect and combat emerging infectious diseases. After 9/11 the Bush administration, motivated in part by the millennial expectations of both the religious Right and secular neo-conservatives, focused even more attention on the prevention of relatively low probability/low lethality bioterrorism than on the higher probability/lethality prospects of emerging infectious diseases such as pandemic flu. Arguably apocalyptic fears around bioterrorism, combined with the influence of the neo-conservatives and biotech lobbies, distorted public health priorities. Or perhaps conversely we have not yet had *sufficient* apocalyptic anxiety about emerging plagues to force governments to take a comprehensive, pro-active approach to public health. (Fortunately efforts at infectious disease monitoring, gene sequencing and vaccine production are advancing nonetheless; a year after Kurzweil and Joy's letter a team at the U.S. National Institutes of Health had used the flu genome to develop a vaccine for the strain (NIH, 2006).)

An example of a more successful channeling of techno-apocalyptic energies into effective prophylaxis was the Millennium Bug or Y2K phenomenon. In the late 1990s a number of writers began to warn that a feature of legacy software systems from the 1960s and 1970s, which coded years with two digits instead of four, would lead to widespread technology failure in the first seconds of 2000. The chips controlling power plants, air traffic, and the sluice gates in sewer systems would suddenly think the year was 1900 and freeze. Hundreds of thousands of software engineers around the world were trained to analyze forty year-old software languages and rewrite them. Hundreds of billions of dollars were spent worldwide on improving information systems, disaster preparedness, and on global investment in new hardware and software, since it was often cheaper simply to replace than to

repair legacy systems (Feder, 1999; Mussington, 2002). Combined with the imagined significance of the turn of the Millennium, Christian millennialists saw the crisis as a portent of the EndTimes (Schaefer, 2004), and secular apocalyptics bought emergency generators, guns and food in anticipation of a prolonged social collapse (CNN, 1998; Kellner, 1999; Tapia, 2003). Some anti-technology Y2K apocalyptics argued for widespread technological relinquishment – getting off the grid and returning to a nineteenth century lifestyle

January 1, 2000 was as unremarkable as all predicted millennial dates have been, but in this case, many analysts believe potential catastrophes were averted due to the pro-active action from governments, corporations and individual consumers (U.S. Senate, 2000), motivated in part by millennial anxieties. Although the necessity and economic effects of pre-Y2K investments in information technology modernization remain controversial, some subsequent economic and productivity gains were probably accrued (Kliesen, 2003). While the size and cost of the Y2K preparations may not have been optimal, the case is still one of pro-active policy and technological innovation driven in part by millennial/apocalyptic anxiety. Similar dynamics can be observed around the apocalyptic concerns over "peak oil," "climate change" and the effects of environmental toxins, which have helped spur action on conservation, alternative energy sources and the testing and regulation of novel industrial chemicals (Kunstler, 2006).

### **Symptoms of Dysfunctional Millennialism in Assessing Future Scenarios**

Some critics denigrate utopian, millennial and apocalyptic impulses, both religious and secular, seeing them as irrational at best, and potentially murderous and totalitarian at worst. They certainly can manifest in the dangerous and irrational ways as I've catalogued in this essay. But they are also an unavoidable accompaniment to public consideration of catastrophic risks and techno-utopian possibilities. We may aspire to a purely rational, technocratic analysis, calmly balancing the likelihoods of futures without disease, hunger, work or death, on the one hand, against the likelihoods of worlds destroyed by war, plagues or asteroids, but few will be immune to millennial biases, positive or negative, fatalist or messianic. Some of these effects can be positive.

These mythopoetic interpretations of the historical moment provide hope and meaning to the alienated and lost. Millennialist energies can overcome social inertia and inspire necessary prophylaxis, and for forcing recalcitrant institutions to necessary action and reform. In assessing the prospects for catastrophic risks, and potentially revolutionary social and technological progress, can we embrace millennialism and harness its power without giving in to magical thinking, sectarianism, and overly optimistic or pessimistic cognitive biases?

I believe so. Understanding the history and manifestations of the millennial impulse, and scrutinizing even our most purportedly scientific and rational ideas for their signs, should provide some correction for their downsides. Based on the discussion above I would identify four dysfunctional manifestations of millennialism to watch for. The first two are the manic and depressive errors of millennialism, tendencies to utopian optimism and apocalyptic pessimism. The other two dysfunctions have to do with the role of human agency, a tendency toward fatalist passivity on the one hand, believing that human action can have no effect on the inevitable millennial or apocalyptic outcomes, and the messianic tendency on the other hand, the conviction that specific individuals, groups or projects have a unique historical role to play in securing the Millennium.

Of course, one may acknowledge these four types of millennialist biases without agreeing whether a particular assessment or strategy reflects them. A realistic assessment may in fact give us reasons for great optimism or great pessimism. Apocalyptic anxiety during the 1962 Cuban missile confrontation between the U.S. and the Soviet Union was entirely warranted, while historical optimism about a New World Order was understandable during the 1989-1991 collapse of the Cold War. Sometimes specific individuals (Gandhis, Einsteins, Hitlers, etc.) do have a unique role to play in history, and sometimes (extinction from gamma-ray bursts from colliding neutron stars or black holes) humanity is completely powerless in the face of external events. The best those who ponder catastrophic risks can do is practice a form of historically-informed cognitive therapy, interrogating our responses to see if we are ignoring counterfactuals and alternative analyses that might undermine our manic, depressive, fatalist or messianic reactions.

One symptom of dysfunctional millennialism is often dismissal of the possibility that political engagement and state action could affect the outcome of future events. While there may be some trends or cataclysms that are beyond all human action all four millennialist biases – utopian, apocalyptic, fatalist and messianic – underestimate the potential and importance of collective action to bring about the millennium or prevent apocalypse. Even messianists are only interested in public approbation of their own messianic mission, not winning popular support for a policy. So it is always incumbent on us to ask how engaging with the political process, inspiring collective action and changing state policy could steer the course of history. The flip side of undervaluing political engagement as too uncertain, slow or ineffectual is a readiness to embrace authoritarian leadership and millenarian violence in order achieve quick, decisive and far-sighted action.

Millennialists also tend to reduce the complex socio-moral universe into those who believe in the eschatological worldview and those who don't, which also contributes to political withdrawal, authoritarianism and violence. For millennialists society collapses into friends and enemies of the Singularity, the Risen Christ, or the Mahdi, and their enemies may be condemning themselves or all of humanity to eternal suffering. Given the stakes on the table – the future of humanity –enemies of the Ordo Novum must be swept aside. Apostates and the peddlers of mistaken versions of the salvific faith are even more dangerous than outright enemies, since they can fatally weaken and mislead the righteous in their battle against Evil. So the tendency to demonize those who deviate can unnecessarily alienate potential allies, and lead to tragic violence. The Jones Town suicides, the Oklahoma City bombing, Al Qaeda, and Aum Shin Rikyo are contemporary examples of a millennial logic in which the murder is required to fight evil and heresies, and wake complacent populations to imminent millennial threats or promises (Whitsel, 1998; Hall, 2000; Mason, 2002). Whenever contemporary millenarians identify particular scientists, politicians, firms or agencies as playing a special role in their eschatologies, as specific engineers did for the Unabomber, we can expect similar violence in the future. A more systemic and politically engaged analysis, on the other hand, would focus on regulatory approaches addressed at entire fields of technological endeavours rather than specific actors, and on the potential for any scientist, firm or agency to contribute to both positive and negative outcomes.

## Conclusions

The millennial impulse is ancient and universal in human culture, and found in many contemporary, purportedly secular and scientific, expectations about the future. Millennialist responses are inevitable in the consideration of potential catastrophic risks, and not altogether unwelcome. Secular techno-millennials and techno-apocalypticists can play critical roles in pushing reluctant institutions toward positive social change or to enact prophylactic policies just as religious millennialists have in the past. But the power of millennialism comes with large risks and potential cognitive errors which require vigilant self-interrogation to avoid.

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